CLAIMS

1. A method of dynamically controlling torque output of a torque producing device, comprising:

determining a shaped torque command based on a torque command generated by an input device;

calculating an actuator variable based on said shaped torque command and a gain; and

regulating an actuator based on said actuator variable to adjust said torque output.

2. The method of claim 1 wherein $T_{COMSHAPED}$ is further based on dynamics of said torque producing device.

3. The method of claim 3 wherein said gain is based on parameters affecting the said torque command.

4. The method of claim 1 wherein said torque producing device is an engine, said actuator variable is an effective throttle area.

5. The method of claim 4 wherein said step of calculating said actuator variable includes determining a mass airflow into an intake manifold of said engine.

6. The method of claim 5 wherein said step of determining said mass airflow into said intake manifold includes calculating a desired mass airflow out of said intake manifold based on a desired APC.

7. The method of claim 6 wherein calculating said airflow out of said intake manifold is based on engine speed and a number of cylinders of said engine.

8. The method of claim 6 wherein said desired mass airflow out of said intake manifold is based on intake manifold volume and a number of cylinders of said engine.

9. The method of claim 5 wherein said mass airflow into said intake manifold is further based on an engine shaping filter and an engine noise rejection filter.

10. The method of claim 5 wherein said step of calculating said actuator variable corresponding to said desired APC is based on said mass airflow into said intake manifold.

11. The method of claim 5, wherein said mass airflow into said intake manifold is based on an ambient air pressure and an ambient air temperature.

12. A method of dynamically controlling torque output of an engine, comprising:

determining a desired air-per-cylinder (APC) based on a torque command;

calculating an effective throttle area corresponding to said desired APC; and

regulating a throttle to provide said effective throttle area.

13. The method of claim 12 wherein said step of calculating said effective throttle area includes determining a mass airflow into an intake manifold of said engine.

14. The method of claim 13 wherein said step of determining said mass airflow into said intake manifold includes calculating a desired mass airflow out of said intake manifold based on said desired APC.

15. The method of claim 14 wherein calculating said airflow out of said intake manifold is based on engine speed and a number of cylinders of said engine.

16. The method of claim 14 wherein said desired mass airflow out of said intake manifold is based on intake manifold volume and a number of cylinders of said engine.

17. The method of claim 13 wherein said desired mass airflow into said intake manifold is further based on an engine shaping filter and an engine noise rejection filter.

18. The method of claim 13 wherein said step of calculating said effective throttle area corresponding to said desired APC is based on said desired mass airflow into said intake manifold.

19. The method of claim 13, wherein said desired mass airflow into said intake manifold is based on an ambient air pressure and an ambient air temperature.

20. A system to dynamically control torque output of an engine, comprising:

a throttle that regulates airflow into said engine; and

a controller that determines a desired air-per-cylinder (APC) based on a torque command, that calculates an effective throttle area based on said desired APC and that regulates a throttle to provide said effective throttle area.

21. The system of claim 20 wherein said controller determines a required mass air flow into an intake manifold based on said requested torque.

22. The system of claim 20 wherein said controller calculates a desired mass airflow out of said intake manifold based on said desired APC.

23. The system of claim 22 wherein said desired mass airflow out of said intake manifold is based on engine speed and a number of cylinders of said engine.

24. The system of claim 22 wherein said controller determines a desired mass airflow into said intake manifold based on said desired mass airflow out of said intake manifold.

25. The system of claim 24 wherein said desired mass flow into said intake manifold is based on intake manifold volume and a number of cylinders of said engine.

26. The system of claim 25 wherein said desired mass airflow into said intake manifold is further based on an engine shaping filter and an engine noise rejection filter.

27. The system of claim 24 wherein said controller determines said effective throttle area based on said desired mass airflow into said intake manifold.

28. The system of claim 22 wherein said airflow out of said intake manifold is based on an ambient air pressure and an ambient air temperature.

29. A method of regulating mass airflow through a throttle to dynamically control torque output of an engine, comprising:

generating a torque command signal;

determining a desired air-per-cylinder (APC) based on said torque command signal;

calculating a desired mass airflow out of an intake manifold based on said desired APC;

determining a desired mass airflow into said intake manifold based on said desired mass airflow out of said intake manifold;

calculating an effective throttle area based on said desired mass airflow into said intake manifold; and

regulating said throttle to provide said effective throttle area.

30. The method of claim 29 wherein said desired mass airflow out of said intake manifold is further based on engine speed and a number of cylinders of said engine.

31. The method of claim 29 wherein said desired mass airflow into said intake manifold is further based on an engine shaping filter and an engine noise rejection filter.

32. The method of claim 29 wherein said effective throttle area is further based on an ambient air pressure and an ambient temperature.